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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Dai Oguro

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7881

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7590

11/16/2009

ANTONELLI, TERRY, STOUT & KRAUS, LLP
1300 NORTH SEVENTEENTH STREET
SUITE 1800
ARLINGTON, VA 22209-3873

EXAMINER

CLARK, GREGORY D

ART UNIT

PAPER NUMBER

1794

MAIL DATE

DELIVERY MODE

11/16/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/584,857	Applicant(s) OGURO, DAI	
	Examiner GREGORY CLARK	Art Unit 1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 13 August 2009.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) 1-3, 7 and 10 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 4-6, 8, 9 and 11-26 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

The examiner acknowledges the receipt of the applicants' amended claims dated 08/13/2009. Claims 1-3, 7 and 10 cancelled, 4-6, 8-9 and 11-12 currently amended, 13-26 new.

Rejections and objections made in previous office action that do not appear below have been overcome by applicant's amendments and therefore the arguments pertaining to these rejections/objections will not be addressed.

Claim Rejections - 35 USC § 103

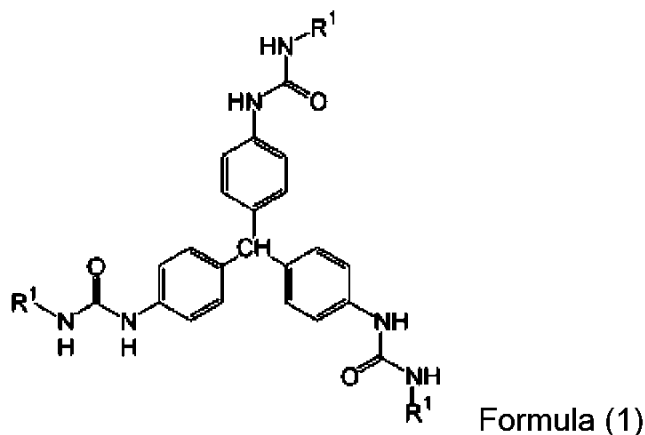
The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

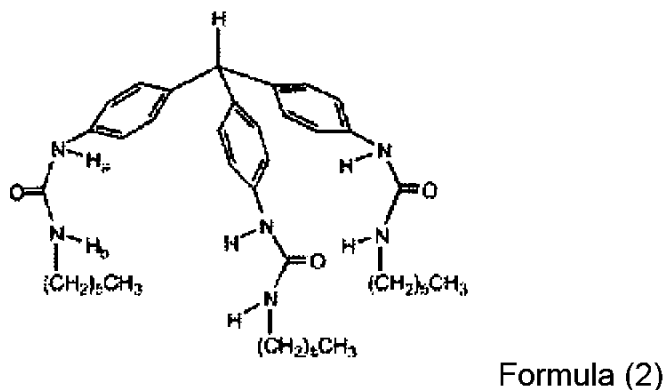
- 1. Claims 4-6, 8, 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (J. Supramolecular Chem. 2 (2002) p. 247-254) in view of Nonlinear dependence of the solubility of water in hydrocarbons on the molar volume of the hydrocarbon by Ruelle (J. Solution Chemistry Vol. 25, No. 7, 1996, p. 657-665).**

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2. **Regarding Claims 4-6**, the applicant claims a R1 value of 4, 8 and 18 carbons atoms for formula (1) shown below:



Fan discloses formula (2) (below) where value of 6 carbon atoms in the R1 position.



Fan discloses a single value of 6 carbons, but this is merely an example.

R1 materials having different lengths are homologs. The effect here is that the longer the carbon chain the more hydrophobic the structure will be as alkane groups are hydrophobic and the longer one makes them the more hydrophobic they are going to

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be; this increases the percentage of hydrophobic material in the overall compound. This is a fundamental understanding in organic chemistry. Ruelle shows how the solubility of different alkanes decreases as the chain length increases (see table 1). Given that the effect of the length of a hydrocarbon chain is well understood as it relates to the hydrophobic nature of the material, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have optimized the length of the carbon chain in the structure of Fan depending on the effect desired for a given application.

In terms of synthesis, the examiner takes the position that the difference in the length of the alkyl group attached to the urea linkage is an obvious variant that one of ordinary skill in the art at the time of the invention could achieve through routine synthetic methods. A synthetic organic chemist would make a series of compounds with varying length for the alkyl groups which would include the range claimed by the applicant. Therefore formula (1) claimed by the applicant would have been obvious with respect to formula (2) disclosed by Fan.

3. **Regarding Claims 8, 11 and 13**, Fan discloses a triphenylmethane derivative represented by Formula (2) shown above. Fan shows Formula (2) where R1 = 6 which overlaps R1 of claim 11 but fails to show where R1 is 1-5 or 11-18 (per claims 8 and 13) and an organic solvent.

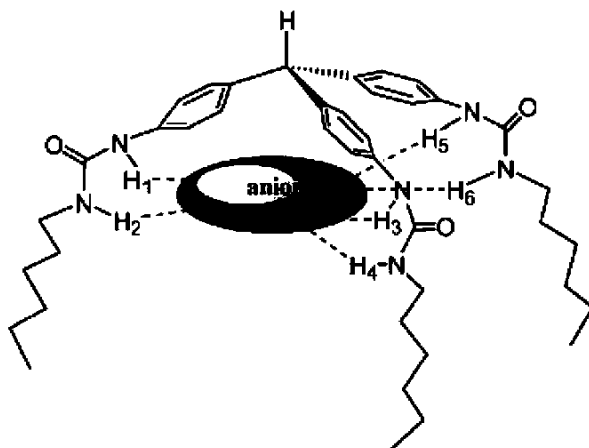
The variation in the length of the R1 subspecies is addressed above on section 2 with the previous rejections.

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In the course of applying a material for a given use whether as a coating or additive, it is common to combine a material with a carrier medium or solvent. It would have been obvious to a person of ordinary skill in the art at the time of the invention to have combined formula (2) with a suitable organic solvent.

4. **Claims 9, 12, 14-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (J. Supramolecular Chem. 2 (2002) p. 247-254) in view of Garner (5,688,440) and in view of Merrill (5,377,760).**

5. **Regarding Claim 9, 12, 14 and 24-26, Fan shows in formula (4) that triphenylmethane urea based compounds can engage in hydrogen bonding with organic materials.**



Formula (4)

Garner discloses that the formation of an organic gel involves attractions between molecules that facilitate the formation of an extensive three-dimensional network that traps the solvent between "strands" of the network. Materials which have multiple polar functionalities (i.e. urea groups in formula 4) allow for network formation by hydrogen bonding (column 1, lines 1-9). The applicant claims an organic fiber diameter of 500nm or less (per claim 9,12 and 14) and 100nm or less (per claim 24-26). Fan fails to teach an organic fiber diameter.

The examiner takes the position that it is well known in the art that the properties of a given fiber can be enhanced or reinforcement by the addition of a gel. It would have been obvious at the time of the invention by a person of ordinary skill in the art to strengthen an organic fiber by adding an organic gel (see Merrill, abstract) that would have includes various diameters including the claimed ranges.

6. **Regarding Claims 15-17**, Fan and Ruelle teach the invention of claims 8,11 and 13.

The formation of an organic gel is addressed in section 5. Fan and Ruelle fails to mention a specific solvent. The applicant claims 1,1,2,2- tetrachloroethane/ decalin, 2-propanol/benzonitrile and propylene carbonate.

It would have been obvious to a person of ordinary skill in the art the time of the invention to have tested a host of solvents to determine which solvents have a suitable interaction with the gelling agent to facilitate the formation of an extensive three-

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dimensional network that traps the solvent dispersion to form a gel based on the teaching of Garner (column 1, lines 1-9).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to have selected from known organic solvents which would have included the claimed solvents.

7. **Regarding Claims 18-20**, Fan shows that triphenylmethane urea based compounds can engage in hydrogen bonding with organic materials (see formula 4, above). Garner discloses that the formation of an organic gel involves attractions between molecules via hydrogen bonding (column 1, lines 1-9). The formation of an organic gel is addressed above in section 5. Fan and Garner fail to mention the process to form a gel.

As Fan and Garner teach organic gels form via hydrogen bonding between the gelling agent and an organic solvent, it is well established that applying heat to a solvent/solute formulation results in a decrease in the hydrogen bonding and a more uniform distribution of the solute (gelling agent) in the solvent. With the subsequent cooling, hydrogen bond would be re-established and an extensive three-dimensional network via hydrogen bonding that traps the solvent dispersion to form a gel would occur.

With the expectation of success, it would have been obvious to a person of ordinary skill in the art at the time of the invention to have mixed a material (gelling agent) which readily engages in hydrogen bonding and an appropriate solvent at an

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elevated temperature to allow uniform mixing followed by subsequent cooling to allow the hydrogen bonding to be suitably re-established resulting in organic gel formation as claimed by the applicant, absent unexpected results.

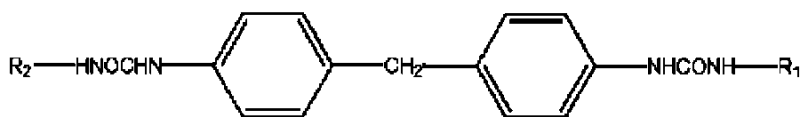
8. **Regarding Claims 21-23**, Fan and Garner teach the formation of an organic gel above in section 5 as related triphenylmethane urea based compounds

As Fan and Garner teach organic gels form via hydrogen bonding between the gelling agent and an organic solvent, it is well established that applying heat to a solvent/solute formulation results in a decrease in the hydrogen bonding and more uniform distribution of the solute in the solvent. With the subsequent cooling, hydrogen bond would be re-established and an extensive three-dimensional network via hydrogen bonding that traps the solvent dispersion resulting in the swelling of the gelling agent (i.e. triphenylmethane urea based compound) during gel formation.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to have selected an organic solvent that had sufficient interaction with a gelling agent to cause the gelling agent to swell due to an extensive three-dimensional network via hydrogen bonding that traps the solvent dispersion as claimed by the applicant, absent unexpected results.

9. **Claims 4-6, 8, 11 and 13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kyodo (JP2003-064346) in view of Fan (J. Supramolecular Chem. 2 (2002) p. 247-254) and in view of Garner (5688440).**

10. **Regarding Claims 4-6**, Kyodo discloses a diphenylmethaneurea derivative represented by formula (3) shown below:



Formula 3

In the above formula, R₁ and R₂ is a linear or branched alkyl chain 1-40 (abstract).

Formula (4) (shown above) differs from formula (1) claimed by the applicant in that there are only two phenylurea groups bonded to the central methane core.

The examiner takes the position that formula (1) claimed by the applicant is an obvious variant of formula (4) disclosed by Kyodo since achieving a tri-substituted methane versus a di-substituted methane is well within the scope of routine organic synthesis. A synthetic organic chemist would make a variety of materials by varying the degree of substitution around the methane core which would include the tri-substituted triphenylmethaneurea derivatives claimed by the applicant. The reason to include a sample with a third urea linkage would have been to improve the gelling capacity of the agent by increasing the hydrogen bonding character of the material (see Garner, column 1, lines 1-9).

Additionally, Fan discloses that such triphenylmethaneurea derivatives (see formula 2, above) engage in hydrogen bonding and were known in the art at the time of the invention.

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11. **Regarding Claims 11 and 13**, Kyodo discloses that diurea compound (formula 4) is an outstanding gelling agent in various organic fluids (paragraph 5). In Formula (4) R1 and R2 is a linear or branched alkyl chain 1-40 (abstract). Formula (4) differs from formula (1) claimed by the applicant in that there are only two phenylurea groups bonded to the central methane core. One would include a sample with a third urea linkage to improve the gelling capacity of the agent by increasing the hydrogen bonding character of the material (see Garner, column 1, lines 1-9).

As Garner discloses that diurea compound (formula 4) is an outstanding gelling agent in various organic fluids (paragraph 5), It would have been obvious to a person of ordinary skill in the art at the time of the invention to have selected a diphenylmethaneurea compound with greater hydrogen bonding capacity than the a triphenylmethaneurea compound and combining the said compound with an organic solvent based on the teaching of Kyodo , absent unexpected results.

12. **Regarding Claims 8**, Kyodo discloses that di-phenylmethaneurea compounds can be used as gelling agents. A synthetic organic chemist would make a variety of materials by varying the degree of substitution around the methane core which would include the tri-substituted triphenylmethaneurea derivatives claimed by the applicant. The reason to include a sample with a third urea linkage would have been to improve the gelling capacity of the agent by increasing the hydrogen bonding character of the material (see Garner, column 1, lines 1-9).

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With the expectation of success, a person of ordinary skill in the art through routine experimentation would apply varying levels of the triphenylmethaneurea (i.e. formula 2, above) derivative to a suitable organic solvent to form a gel.

13. Claim 9,12 and 14-26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kyodo (JP2003-064346) in view of Fan (J. Supramolecular Chem. 2 (2002) p. 247-254) and in view of Garner (5688440) in view of Merrill (5,377,760).

14. Regarding Claims 9 and 12, Kyodo discloses that diurea compound (formula 4) is an outstanding gelling agent in various organic fluids (paragraph 5). Fan teaches in formula (3) that triphenylmethaneurea based compounds can engage in hydrogen bonding with organic materials. Garner discloses how hydrogen bonding is used in the formation of an organic gel (column 1, lines 1-9). The applicant claims an organic fiber diameter of 500nm or less. Kyodo fails to teach an organic fiber diameter.

The examiner takes the position that it is well known in the art that the properties of a given fiber can be enhanced or reinforced by the addition of a gel. It would have been obvious at the time of invention by a person of ordinary skill in the art to strengthen an organic fiber by adding an organic gel (see Merrill, abstract).

Through routine experimentation a person of ordinary skill in the art would adjust the level of organic gel added to the fiber to control the degree of swelling of the fiber

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which ultimately would give a diameter range for the fiber that would include the range claimed by the applicant (per claims 9 and 12).

15. **Regarding Claims 14 and 24-26**, Kyodo discloses that diurea compound (formula 4) is an outstanding gelling agent in various organic fluids (paragraph 5). Fan teaches in formula (3) that triphenylmethaneurea based compounds can engage in hydrogen bonding with organic materials.

Garner discloses that the formation of an organic gel involves attractions between molecules that facilitate the formation of an extensive three-dimensional network that traps the solvent between "strands" of the network. Materials which have multiple polar functionalities (i.e. urea groups in formula 4) allow for network formation by hydrogen bonding (column 1, lines 1-9). The applicant claims an organic fiber diameter of 500nm or less (per claim 9,12 and 14) and 100nm or less (per claim 24-26). Fan fails to teach an organic fiber diameter.

The examiner takes the position that it is well known in the art that the properties of a given fiber can be enhanced or reinforcement by the addition of a gel. It would have been obvious at the time of the invention by a person of ordinary skill in the art to strengthen an organic fiber by adding an organic gel (see Merrill, abstract) that would have includes various diameters including the claimed ranges (per claims 14 and 25-26).

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16. **Regarding Claims 15-17** Kyodo, Fan and Garner teach the invention of claims 8,11 and 13.

The formation of an organic gel is addressed in section 11. Kyodo, Fan and Garner fails to mention a specific solvent. The applicant claims 1,1,2,2-tetrachloroethane/decalin, 2-propanol/benzonitrile and propylene carbonate.

It would have been obvious to a person of ordinary skill in the art the time of the invention to have tested a host of solvents to determine which solvents have a suitable interaction the gelling agent to facilitate the formation of an extensive three-dimensional network that traps the solvent dispersion to form a gel based on the teaching of Garner (column 1, lines 1-9).

It would have been obvious to a person of ordinary skill in the art at the time of the invention to have selected from known organic solvents that engage in hydrogen bonding with gelling agents which would have included the claimed solvents.

17. **Regarding Claims 18-20**, Kyodo discloses that diurea compound (formula 4) is an outstanding gelling agent in various organic fluids (paragraph 5). Fan teaches in formula (3) that triphenylmethaneurea based compounds can engage in hydrogen bonding with organic materials.

The formation of an organic gel is addressed above in section 11. Kyodo , Fan and Garner fail to mention the process to form a gel.

As Kyodo, Fan and Garner teach organic gels form via hydrogen bonding between the gelling agent and an organic solvent, it is well established that applying

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heat to a solvent/solute formulation results in a decrease in the hydrogen bonding and a more uniform distribution of the solute in the solvent. With the subsequent cooling, hydrogen bonding would be re-established and an extensive three-dimensional network via hydrogen bonding that traps the solvent dispersion to form a gel would occur.

With the expectation of success, it would have been obvious to a person of ordinary skill in the art at the time of the invention to have mixed a material (gelling agent) which readily engages in hydrogen bonding and an appropriate solvent at an elevated temperature to allow uniform mixing followed by subsequent cooling to allow the hydrogen bonding to be suitably re-established resulting in organic gel formation as claimed by the applicant, absent unexpected results.

18. **Regarding Claims 21-23**, Kyodo, Fan and Garner teach the formation of an organic gel above in section 11 as related triphenylmethane urea based compounds

As Kyodo, Fan and Garner teach organic gels form via hydrogen bonding between the gelling agent and an organic solvent, it is well established that applying heat to a solvent/solute formulation results in a decrease in the hydrogen bonding and more uniform distribution of the solute in the solvent. With the subsequent cooling, hydrogen bond would be re-established and an extensive three-dimensional network via hydrogen bonding that traps the solvent dispersion resulting in swelling of the gelling agent (i.e. triphenylmethane urea based compound) during gel formation.

It would have been obvious to a person of ordinary skill in the art at the time of the invention to have selected an organic solvent that had sufficient interaction with a

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gelling agent to cause the gelling agent to swell due to an extensive three-dimensional network via hydrogen bonding that traps the solvent dispersion as claimed by the applicant, absent unexpected results.

Response to Amendment

The applicant argues that the prior art does not teach the use of triphenylmethane urea based compounds as an organic gelling agent nor a process to produce an organic gel.

The examiner counters that Kyodo discloses that a diphenylmethane urea based compound (formula 4) is an outstanding organic gelling agent in various organic fluids (paragraph 5) that differ from the applicants' compound as diphenyl substitution versus triphenyl substitution. Garner clearly teaches that hydrogen bonding is involved in organic gel formation. It is well understood in the art that highly polar groups such as ureas are noted for engaging in hydrogen bonding and this would be obviously at play in the diphenylmethane urea based compound taught by Kyodo.

A synthetic organic chemist would make a variety of materials by varying the degree of substitution around the methane core which would include the tri-substituted triphenylmethaneurea derivatives claimed by the applicant. The reason to include a sample with a third urea linkage would have been to improve the gelling capacity of the agent by increasing the hydrogen bonding character of the material. The triphenylmethaneurea derivatives would have been a good candidate especially since

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Fan shows how the triphenylmethaneurea derivatives engage in hydrogen bonding with a polar species. With the teaching of Garner, one would clearly seek to make synthetic materials with increased hydrogen bonding capacity. Whereby an obvious and the simplest synthetic target would be to extend the series of Kyodo by adding an additional phenylurea group to make a homolog, absent unexpected results.

In terms of the process, Kyodo/Fan and Garner teach that organic gels form via hydrogen bonding between the gelling agent and an organic solvent, it is well established that applying heat to a solvent/solute formulation results in a decrease in the hydrogen bonding and more uniform distribution of the solute (gelling agent) in the solvent. With the subsequent cooling, hydrogen bond would be re-established and an extensive three-dimensional network via hydrogen bonding would form that traps the solvent dispersion to form a gel.

With the expectation of success, it would have been obvious to a person of ordinary skill in the art at the time of the invention to have mixed a material (gelling agent) which readily engages in hydrogen bonding with an appropriate solvent at an elevated temperature to allow uniform mixing followed by subsequent cooling to allow the hydrogen bonding to be suitably re-established resulting in organic gel formation as claimed by the applicant, absent unexpected results.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREGORY CLARK whose telephone number is (571)270-7087. The examiner can normally be reached on M-Th 7:00 AM to 5 PM Alternating Fri 7:30 AM to 4 PM and Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/D. Lawrence Tarazano/
Supervisory Patent Examiner, Art Unit 1794

GREGORY CLARK/GDC/
Examiner
Art Unit 1794